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SOME NEW ZOOFLAGELLATES FROM HUNGARY

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Abstract

This paper reports on new Zooflagellate species collected in Hungary. The most important hydrochemical properties of their environment are also given. The new *Mastigamoeba, Mastigella, Bicoeca, Amastigomonas* and *Hexamita* species were recovered from various aquatic biotopes, from rivers to waste water purification plants.

Introduction

The microorganisms were studied in living condition under the microscope. They were stained with vital dyes (methylene blue, neutral red) and various methods of fixation and staining were also used (KIRBY 1950). In most cases osmium fixation and carmin acetic acid staining was adopted. Parameters indicative of pollution are summed up in Table 1. The free-living zooflagellates were classified according to the recommendations of HONIGBERG (1963), HONIGBERG, BALMUTH et al. (1964) and on the basis of other taxonomic works (BOURRELLY 1957, BÜTSCHLI 1883–1887, CALKINS 1926, DOFLEIN, REICHENOV 1927, 1952, GRASSÉ 1952, HALL 1953, JIROVEC 1953, LEMMERMANN 1914, LEPSI 1965, STARMACH 1968, ZHOUKOV 1971).

Observations

Phylum	**Protozoa** GOLDFUSS
Subphylum	**Sarcomastigophora** HONIGBERG et BALAMUTH
Class	*Mastigophora* DIESING *(Zooflagellata)*
Order	*Rhizomastigida* BÜTSCHLI emend. HONIGBERG
Family	*Mastigamoebidae* GOLDSCHMIDT
Genus	*Mastigamoeba* SCHULZE 1875

Mastigamoeba polysaprobica spec. nov. (Fig. 1–5)

Cells usually sphaeroid, strongly metabolic, 30–45 μ in diameter. The flagellum is of 2 fold body-length. Periplast thin, smooth and hyalin. In the strongly granulated protoplasm there are 1–8 contractile vacuoles and numerous food vacuoles. There is no or only slight difference between the acto- and endoplasm. Pseudopodia, in

Table I

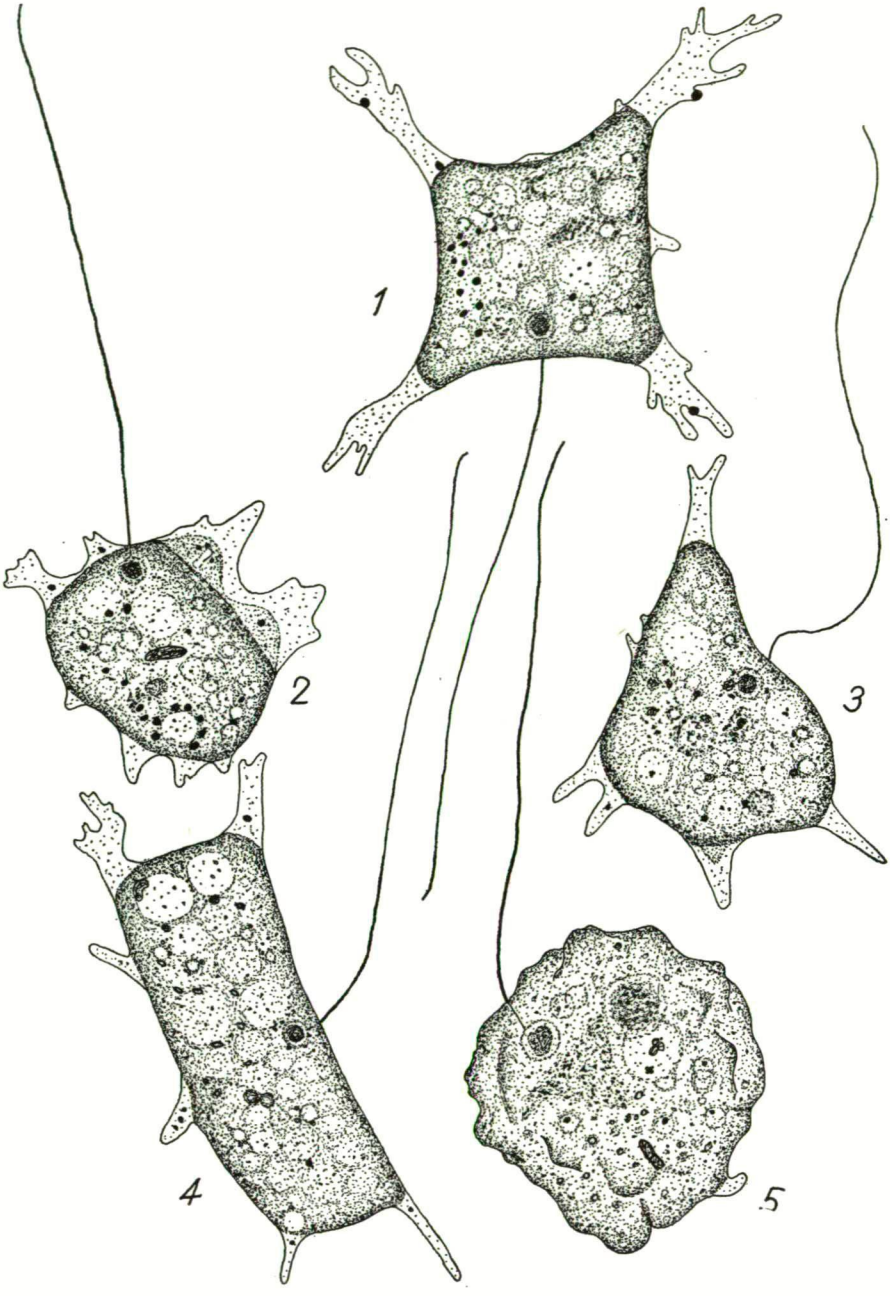

Fig. 1—4. *Mastigamoeba polysaprobica*, 5. *Mastigamoeba polysaprobica*, stained.

the form of lobopodia and filopodia project from different parts of the body. Nucleus near the flagellum, connected with it by a rhizoplast. Motion slow creeping on the substrate. It feeds mainly on bacteria, coprozoic.

It was first found in the purified sewage of the Refrigerator Works, Jászberény, on July 14, 1970, but also occurred in other heavily polluted waters (e.g. sugar-mill wates). In its first place of occurrence it was consistently found together with *Mastigamoeba steinii* KLUG, *Mastigamoeba gigantea* (PROWAZEK) KLUG, *Cercobodo digitalis* (H. MEYER) LEMM., *Cercobodo heimi* HOLLANDE, *Tetramitus pyriformis* KLEBS, *Treptomonas agilis* DUJ. and bacteria. Polysaprobic, which is also indicated by its name.

It is most similar to strains *Mastigamoeba sapropelica* LEPSI and M. sordis LEPSI. It is distinguished from the former by its greater size and different formation of pseudopodia, and from the latter by its swimming form and by the presence of numerous contractile vacuoles (LEPSI 1955, 1965). Its typical form is illustrated in Fig. 2.

Genus *Mastigella* FRENZEL emend. GOLDSCHMIDT 1907

Mastigella parva spec. nov. (Fig. 6–8)

The cell is oval or strongly elongated ovoid. The anterior pole is bluntly tapered, often elongated, the posterior pole is rounded or blunt, ending in a short tip. Laterally the cell may be very undulating. Periplast thin, smooth, hyalin. The protoplasm is sharply differentiated to ecto- and endoplasm. The plasm is spotted by little granules. Contractile vacuole posterior, the nucleus may occur in any part of the cell, it is not in connection with the flagellum of 1.5–2 fold bodylength. Motion floating-bowing or creeping on the substrate. Coprozoic. The cell is small, of 15–20×4–8 μ size, hence its nomination.

It was first found in the purified sewage of the Municipal Sewage Plant of Cegléd on April 21, 1970, together with *Mastigamoeba paramylon* (FRENZEL) LEMM., *Cercobodo longicauda* (STEIN) SEEN, *Bodo caudatus* DUJARDIN, *Tetramitus pyriformis* KLEBS, *Hexamita inflata* DUJARDIN and bacteria. Polysaprobic.

The species most closely resembles *Mastigella limax* SKUJA, but the size of the new species is smaller and its flagellum is longer (LEMMERMANN 1914, LEPSI 1965, SKUJA 1964). Its typical form is illustrated in Fig. 8.

Mastigella maculosa spec. nov. (Fig. 9–11)

The cell is oval or elongated ovoid, anteriorly narrowed and ending in a blunt apex, posteriorly rounded. Size of the cell is 25–30×7–10 μ. Flagellum of 1.5 body-length projects from the tip. Periplast thin, smooth and hyalin. Protoplasm is spotted by granules of various sizes. Nucleus posterior, the 1–2 contractile vacuoles are situated in various parts of the body. Ecto- and endoplasm are not markedly different. Pseudopodia are simple lobopodia, located in different parts of the body. Usually creeps on the substrate, feeds on bacteria. Coprozoic.

It was first found in the purified waste water of the dairy plant of Kisújszállás, on February 19, 1971 together with *Tetramitus pyriformis* KLEBS, *Chilomastix undulata* SKUJA, *Hexamita pusilla* KLEBS and bacteria, but also occurred in waster of other dairy plants and sugar-mills. Polysaprobic. Its name refers to the spottedness of the protoplasm.

It most nearly resembles Mastigella limax, but it is not cylindrical, the flagellum is longer and the size of the cell is smaller. Its typical figure is illustrated in Fig. 9.

Table II

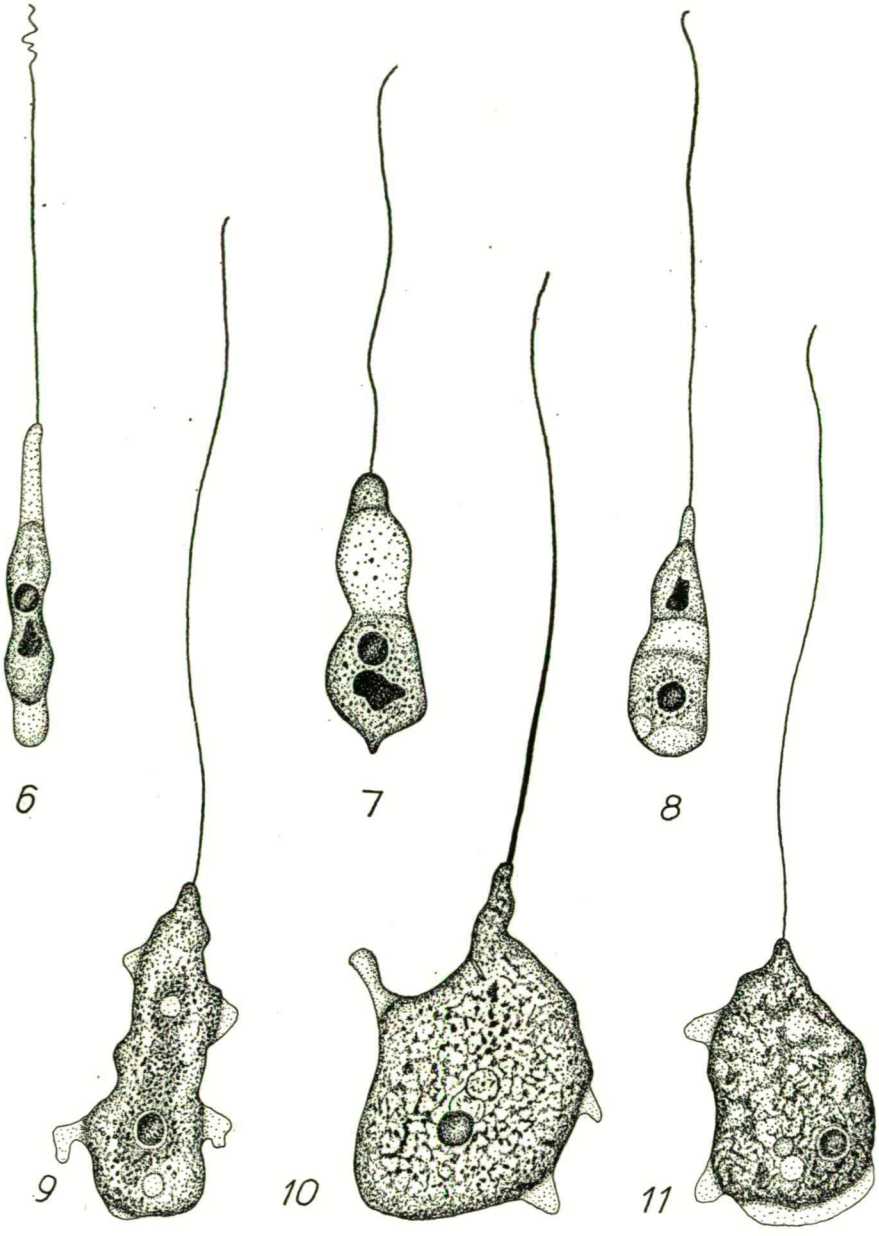

Fig. 6—8. *Mastgella parva*, 5. *Mastigella parva*, stained, 9—10. *Mastigella maculosa* 11. *Mastigella maculosa*, stained.

Mastigella ovata spec. nov. (Fig. 12–16)

In the swimming state the shape of the cell is oval or elongated ovoid. Anteriorly often slightly tapered, posteriorly rounded. Creeping on the substrate, it projects lobopodia at the posterior pole. Its size is 10–18×9–11 μ. Flagellum three-five times longer than the body. Periplast thin, smooth and hyalin. Protoplasm hyalin, there are 1–2 contractile vacuoles and a few food vacuoles situated in different parts of the protoplasm. Nucleus anterior. The plasm is spotted by granules. Motion slow swimming, or creeping movement on the substrate. Coprozoic.

It was first found in the unpurified and purified sewage water of the T. B. Sanatorinm of Újszász, on February 3, 1970, together with *Oicomonas termo* (EHR.) KENT, *Trigonomonas diacra* KLUG, *Trigonomonas inflata* SKUJA, *Streptococcus margaritaceus* SCHROETER, *Sarcina palludosa* SCHROETER and other bacteria. Polysabrobic. Its name refers to its ovoid shape.

It bears closest resemblance to *Mastigella commutans* (H. MEYER) GOLDSCHMIDT, but is distinguished from it by its oval shape and tapering anterior part. Its typical shape is shown in Fig. 14 (LEMMERMANN 1914, LEPSI 1965).

Mastigella compacta spec. nov. (Fig. 23–24)

The cell is oval, may be strongly metabolic. The poles are rounded, anterior part seldom concave. The cell is 20–25×7–14 μ in size, flagellum of 1.5–2 body-length. Periplast thin, hyalin, slightly granulated. Protoplasm is highly granular and spotted. Nucleus anterior, but the rhizoplast is missing. There is a contractile vacuole in the anterior part. Ecto- and endoplasm are not markedly different. Pseudopodia, which are simple lobopodia project at various parts of the body. Its motion is a slow creeping movement on the substrate. Coprozoic.

It was first found in the pure water of the brook Tarna, on February 24, 1970, together with diatoms and *Lagoena obovata* LEMMERMANN, *Bicoeca conica* LEMMERMANN, *Bodo nasutus* SKUJA, *Cercobodo rhynchophorus* SKUJA, *Cercobodo chromatiophagus* SKUJA, *Hexamita tremelloranis* SKUJA, *Stephanocodon socialis* (LAUTER.) PASCHER, *Desmarella brachycalyx* SKUJA. Beta-mesosaprobic, its name refers to its shape.

It is similar to the species *Mastigella commutans* (H. MEYER) GOLDSCHMIDT, although its shape is strongly metabolic and its flagellum is shorter (LEMMERMANN 1914, LEPSI 1965). Its typical form is illustrated in Fig. 23.

Order *Kinetoplastida* HONIGBERG
Suborder *Bodonina* HOLLANDE
Family *Bodonidae* BÜTSCHLI
Subfamily *Bodoninae* BÜTSCHLI
Genus *Amastigomonas* DE SAEDELEER 1931

Amastigomonas borokiensis spec. nov. (Fig. 17–21)
(syn.: *Amastigomonas* sp. ZHOUKOV 1971, Table. IV. Fig. 2a–g)

The naked cell devoid of flagellum is anteriorly narrowing and ends in a curved proboscis of one third body-length. Its posterior part is narrowed, little rounded or slightly tapering. At the posterior pole, it may project a thin, simple pseudopodium. Size 5–9×3–4 μ. Periplast thin and hyalin. Protoplasm is spotted in different degrees for the presence of tiny granules. In the posterior half, there is one contractile vacuole. Nucleus anterior, connected with the basal body by the rhizoplast. At the basel body

Table III

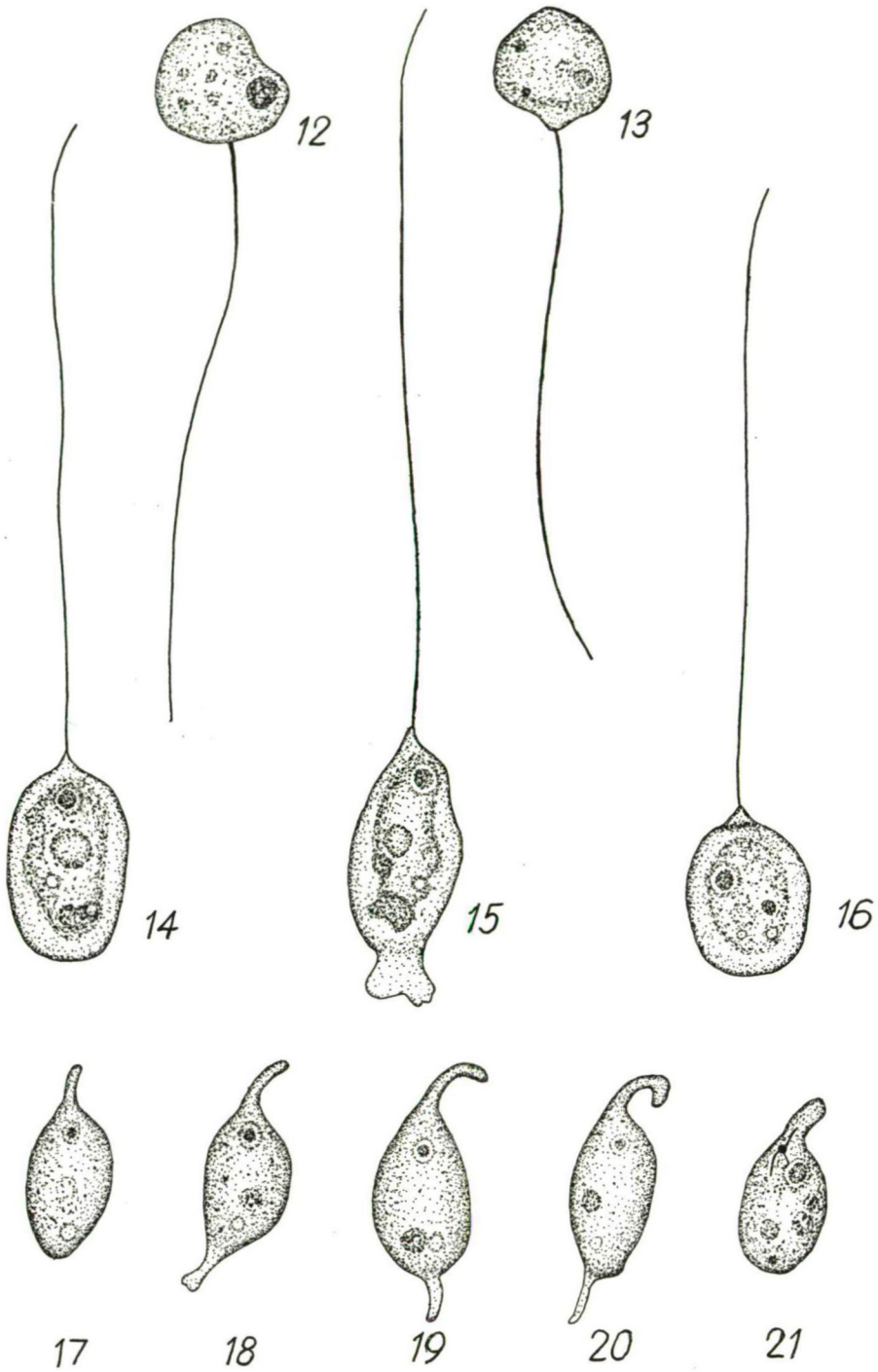

Fig. 12—13. *Mastigella ovata*, stained, 14—16. *Mastigella ovata*, 17—20. *Amastigomonas borokiensis*, stained.

short aborted flagellae project in the direction of the proboscis and backwards (Fig. 21). Motion slow, bowing or creeping on the substrate.

This organism was first mentioned by Zhoukov (1971) from Rybinsk reservoir, and he named it Amastigomonas sp. In Hungary, it occurred in the sediment of the fish-ponds of Bánhalma (at a water depth of 1 m). On May 27, 1972 it was found in pond No. 8 together with *Mastigamoeba torulosa* Skuja, *Mastigamoeba lacustris* Penard, *Mastigella simplex* Skuja, *Mastigella caput-medusae* Klug, *Mastigamoeba socialis* Penard, *Bodo parvus* Naegler, *Cercobodo minutus* Valkanov, *Trigonomonas aechme* Skuja. It is assumedly an alpha-mesosaprobic organism. The sediment and the water above it in the fish-pond has not been analysed chemically.

It is distinguished from the species *Amastigomonas debruynei* de Saedeleer by its oval shape and relatively smaller proboscis (Grassé 1952, Zhoukov 1971). Its typical form is shown in Fig. 17. The name of this organism refers tothe Hydrobiological Center of Borok at Rybinsk reservoir.

Family *Cercobodonidae* Hollande
Genus *Cercobodo* Krassiltschik 1886

Cercobodo robustus spec. nov. (Fig. 25–26, 40)

The cell is cylindrical, strongly metabolic. Its anterior part is rounded, devoid of flagellar depression, posteriorly tapering into a thin apex. The body often looses its cylindrical shape, becomes widened, assuming a spindle or oval shape.

Pseudopodia are formed in the posterior part, they may be thin and long, or thick and fanning out. Flagella of about body length originate from the apex. The swimming-flagellum is somewhat shorter. Periplast is thin, smooth and hyalin. Protoplasm finely granulated, nucleus and contractile vacuole anterior. Motion fast vibrating or creeping on the substrate. Saprophytic, coprozoic. The size of the cell is 26–31×3–9 μ.

It was found on the first occasion in the waste water of BVM Works, in Szolnok, on March 29, 1971 together with *Trepomonas steinii* Klebs, *Cercobodo longicauda* (Stein) Senn, *Hexamita fusiformis* Klebs and bacteria. It was also found in other sewages. Polysaprobic, its name refers to its shape and size.

The new species shows a close similarity to *Cercobodo draco* Skuja, although it is distinguished from it by its size, the lack of subapical flagellar depression and the form of pseudopodium formation (Lemmermann 1914, Skuja 1946–48, Starmach 1968). Its typical figure is shown in Fig. 26.

Cercobodo venticosus spec. nnv. (Fig. 33—34, 36).

The cell is oval or elongated spindle shaped, with an upper part consisting of a narrowing, long neck, from the apex of which a swimming-flagellum of 2 fold body-length projects forward, and a trailing flagellum of 1.5 fold body-length projects backwards. The bottom is rounded or ends in a blunt apex. Pseudopodia, which are simple lobopodia, project from the posterior pole. Periplast thin, smooth and hyalin. Protoplast finely granulated. Nucleus and contractile vacuole median. When swimming, its motion is wobbling, when creeping on the substrate, it projects pseudopodia. Saprophytic coprozoic. Size 19–25×4–7 μ.

It was found at first in the polluted water of the brook Körösér below Nagykőrös, on October 14, 1969, together with *Heterochromas vulgaris* (Cienk.) Pascher, *Cercobodo draco* Skuja, *Cercobodo ellipticus* Valkanov, *Hexamita angusta* (Klebs) Lemmermann, *Vorticella microstoma* Ehrenberg and bacteria. Polysaprobic. It was named after its shape.

Table IV

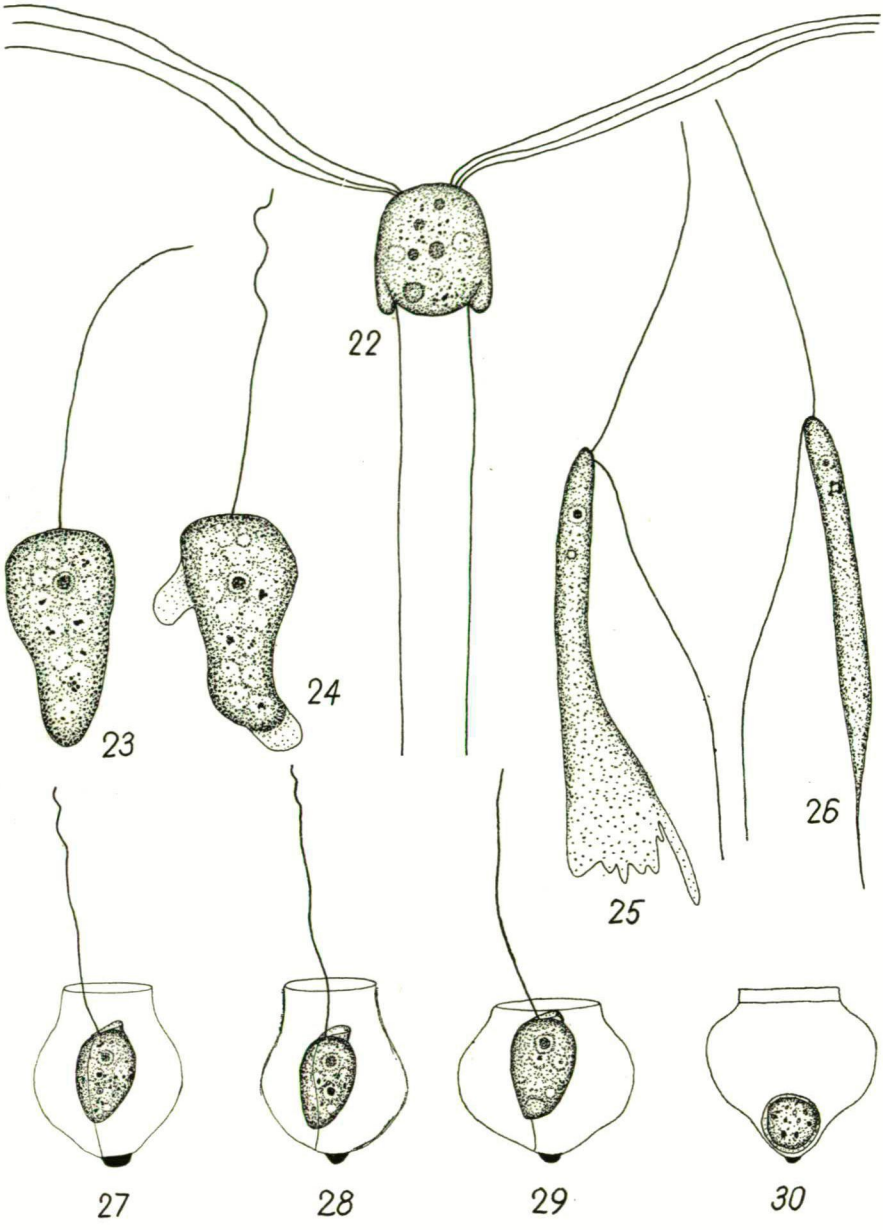

Fig. 22. *Hexamita longifila* ,23—24. *Mastigella compacta*, 25—26. *Cercobodo robustus*
27 | 29. *Bicoeca starmachi*, 30. *Bicoeca starmachi*, cysta

It is similar to *Cercobodo draco* SKUJA and *C. acutus* SKUJA, but the persistent oval shape of the posterior part distinguishes it from these species (LEMMERMANN 1914, SKUJA 1946–48, STARMACH 1968). Its typical form is shown in Fig. 33.

Cercobodo lagoenaris spec. nov. (Fig. 37–39)

In swimming state it is elongated ovoid, metabolic, rounded at the bottom, on the top narrowing and ending in a neck. When creeping on the substrate it often assumes a spherical shape. The size of the cell is 11–19×5–8 μ. Flagella of about 1.5 fold bodylength originate from the apex. The swimming-flagellum is somewhat shorter. The trailing flagellum is occasionally attached to the anterior part of the body, and as a consequence of the motion of the flagellum, the periplast becomes undulate, but does not form a membrane. Periplast thin, smooth and hyalin. The protoplasm is spotted by granules of different sizes. Nucleus median. The contractile vacuole is situated in different parts of the body. Pseudopodia project from the posterior part. These are lobopodia. Motion wobbling-bowing or creeping. Saprophytic, corpzoic.

It was found on the first occasion in domestic sewage at Mezőtúr, in the company of *Bodo caudatus* DUJARDIN, *Cercobodo longicauda* (STEIN) SEENN, *Pleuromonas nasuta* SKUJA and bacteria. Polysaprobic, named after its bottle shape.

It perhaps best resembles certain forms of *Cercobodo cometa* HOLLANDE (GRASSÉ 1952, Fig. 535 d), but differs from them in size, in the formation of pseudopodia and the figure of its anterior part. Its typical form is shown in Fig. 39.

Order	*Bicoecida* HOLLANDE
Family	*Bicoecidae* KENT
Genus	*Bicoeca* (J. CLARK) STEIN 1978.

Bicoeca starmachi spec. nov. (Fig. 27–30)

Planktonic, free-swimming species. Lorica urn-shaped, most variable, in front neck-like projecting. Median part widened and different in shape. Posterior part attenuatedly rounded or broadly rounded. At the posterior pole, there is always a great verruca. The membrane of the lorica is thin, smooth and hyalin. The oval cell is transversely cut on the top, peristome low and unilateral. At the bottom the cell is tapering or rounded. The swimming-flagellum is of 3 fold body-length, the other flagellum (flagello postico) is rigid and attaches the cell to the base of the lorica. Periplast thin, smooth and hyalin. Protoplasm spotted, the single contractile vacuole basal, nucleus central. Its motion is slowly rotating. Lorica is of 9–13×8–11 μ size, the cell of 5–7×3.5 μ and the pore of of 3.5–4.5 μ size.

It was found in the stagnant water dead-arm of the Tisza, named "Borzanat", together with *Stokesiella epipyxis* PASCHER, *Stokesiella acuminata* LEMMERMANN. *Stokesiella dissimilis* (STOKES) LEMMERMANN, *Stokesiella longipes* (STOKES) LEMMER, MANN, *Monosiga ovata* KENT, *Monosiga fusiformis* KENT, *Monosiga angustata* KENT, *Desmarella sphaeroidea* (SCHILLER) BOURRELLY and epiphytic algae, on July 20, 1969- Beta-mesosaprobic. Named in honour of Professor KAROL STARMACH.

The appearance of this species best resembles the species *Bicoeca turrigera* NYGAARD and *Bicoeca urceolata* FOTT, although it differes from the former by its thinner and smooth lorica, and from the latter by its different shape. Compared to both of them, the lorica is always colourless, the pore is occasionally ringed and there is a verruca at the bottom (FOTT 1944, NYGAARD 1949, STARMACH 1968).

Bicoeca szabadosi spec. nov. (Fig. 48–50)

Plaktonic, free-swimming species. Lorica thin, hyalin and naked. Cylindrical, broadly rounded posteriorly. The anterior part is occasionally funnel-like widened. The cell does not fill in the lumen, it is oval, at the top obliquely cut, at the bottom rounded. Peristome low, occasionally not visible. The swimming-flagellum is of 2–3 fold body-length. Periplast thin, translucent. In the protoplasm the nucleus centra, there are 1–2 contractile vacuoles. The cell is attached to the basal part of the lorica by means of the second flagellum. It moves along with slow rotating motion. Size of the lorica is 20×7–8 μ, that of cell 7–8×5–6 μ.

It was found for the first time in the main canal of Nagykunság in front of the impoundment at Kisköre on 1973 but also often occurred in the impounded reach of the Tisza at Kisköre, together with planktonic algae. Alpha-beta-mesosaprobic.

It was named in honour of the protistologist Margit Szabados.

It best resembles the species *Bicoeca cylindrica* (LACKEY) BOURRELLY, although the size of its lorica and the fact, that its lorica is naked and rounded at the bottom separates it from the above species. *Bicoeca cylindrica* also occurred in the same place, thus opportunity was given for their comparison (BOURRELLY et GEORGES 1953, WILLÉN 1963, STARMACH 1968). Its typical form is shown in Fig. 48.

Order	*Polymastigida* BLOCHMANN emend. REICHENOW
Suborder	*Diplomonadina* CALKINS
Family	*Hexamitidae* KENT
Genus	*Hexamita* DUJARDIN 1838

Hexamita longifila spec. nov. (Fig. 22)

The cell is spherical oval, occasionally a little flattened, measuring 13–15 μ in diameter. Posteriorly sometimes broadly rounded, with striae reaching to two third of body-length, which produce ear-like formations on both sides. These seldom outreach the cell. Flagella of 3–4 fold body-length, the swimming-flagella project from both sides of the front part, and the trailing flagella from the split of the posterior part. Periplast thin, smooth and hyalin. Protoplasm is spotted by granules of various sizes. In the plasm numerous food vacuoles and 1–4 contractile vacuoles are situated dispersedly. Motion slow, floating.

It occurred in the raw waste water of the flour-milling works at Törökszentmiklós on May 12, 1970, together with *Mastigamoeba radiata* KLUG, *Mastigella polyvacuolata* (MORROFF) GOLDSCHMIDT, *Trepomonas agilis* DUJARDIN, *Hexamita crassa* KLEBS and bacteria. Polysaprobic, named after its characteristically long flagella.

It is similar to the species *Hexamita pusilla* KLEBS, but there are some features at variance with this species, as the longer flagellum, the situation of the split, the motion, which is not rotating. Fig. 22 shows its typical form.

Hexamita skujai spec. nov (Fig. 31—32, 35).

Its fast swimming form is elongated oval, the anterior part is rounded, the posterior one the same or slightly tapering. Cell size is 13–15×6–7 μ. The swimming-flagella are of body-length and project from both sides of the anterior part. The trailing flagella are of body-length and originate from the posterior pole which is devoid of a split. Between the two flagella there is a thinner-thicker plasma membrane.

Table V

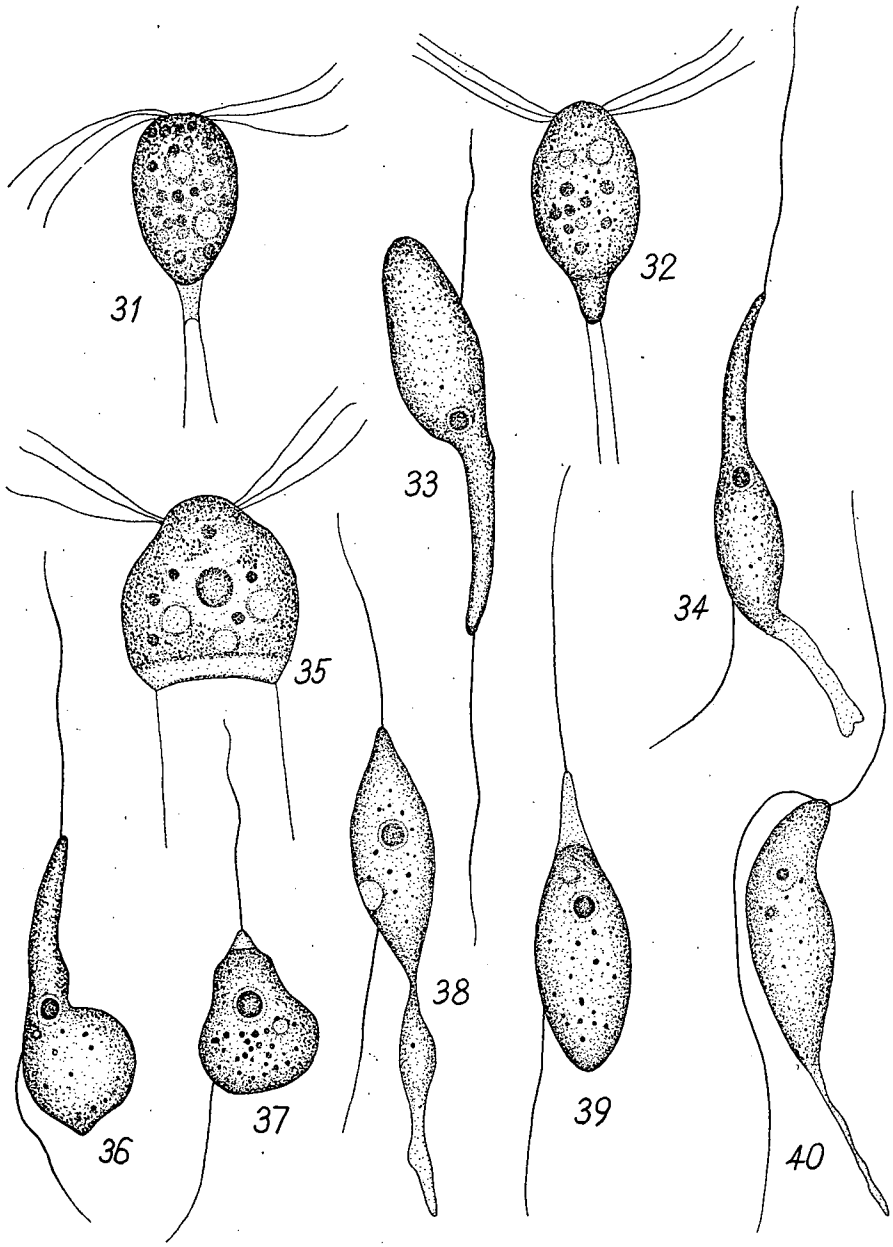

Fig. 31—32. 35. *Hexamita skujai*, 33—34, 36. *Cercobodo ventricosus*, 37. *Cercobodo* lagoenaris, 40. *Cercobodo robustus*.

The floating or slowly rotating form is swollen anteriorly, posteriorly broad, dorsoventrally flattened. Its size is 13–16×11–13 μ. The posterior part is strongly metabolic.

Periplast thin, smooth and hyalin. Protoplasm seldom strongly granulated, not translucent. 2–3 contractile vacuoles are situated in different parts of the plasm.

It was found for the first time in the raw waste water of the piggery at Tiszaszentimre on August 28, 1970, together with *Mastigamoeba gigantea* (PROWAZEK) KLUG, *Tetramitus pyriformis* KLEBS, *Trepomonas agilis* DUJARDIN and bacteria. It is frequent in other wastes, too. Polysaprobic. Named in honour of Professor H. SKUJA.

It is similar to *Hexamita fusiformis* KLEBS and *Hexamita fissa* KLEBS, but its poles are rounded and the cells are splitless. It is metabolic. Its typical form is shown in Fig. 31.

Hexamita hollandei spec. nov. (Fig. 41–43)

The tiny cell, 5–6 μ in diameter, is generally spherical, occasionally oval. Flagella are of body-length, the swimming-flagella project from both sides of the anterior part, the trailing flagella project on both sides of the posterior pole from the splitless body. Periplast thin, smooth and hyalin. Protoplasm granulated in varying degrees. In the plasm 1–4 contractile vacuoles occur dispersedly. Motion rotating or floating.

It was often found in the polluted water of the Körösér brook (the first time on December 10, 1971), together with *Oscillatoria chlorina* (KÜTZ.) GOM., *Bodo cruzi* HARTMANN et CHAGAS, *Bodo putrinus* (STOKES) LEMMERMANN, *Trepomonas agilis* DUJARDIN, *Hexamita fissa* KLEBS and bacteria. Polysaprobic. Named in honour of the French protistologist A. HOLLANDE.

The new species best resembles the species *Hexamita pusilla* KLEBS, but its measurements, the lack of striae, and the fact that the trailing flagella originate from the posterior pole, separates it from this species. Its typical form is shown in Fig. 41.

Hexamita gracilima spec. nov. (Fig. 44–45)

The cell is elongated spindle-shaped, anteriorly with a neck-like narrowing, which ends in a broadly rounded head-part. The body is slightly widened about its middle part, it is narrowed posteriorly. The size of the cell is 16–20×2–2.5 μ. The swimming-flagella, which are shorter than the body, are situated on both sides of the front part.

Trailing flagella originate from the nonstriated body at the tapering posterior pole. Periplast thin, smooth and hyalin. There are a few glycogen droplets in the finely granulated plasm. Posteriorly there is one contractile vacuole. Its motion is fast, ratating or walking.

It was found in the slightly polluted water of the Hortobágy–Berettyó Canal on December 10, 1971, together with algae, and *Desmarella pyriformis* (SCHILLER) BOURRELLY, *Salpingoeca urceolata* KENT, *Salpingoeca langenella* STOKES, *Lagoena ovata* LEMMERMANN, *Bicoeca oculata* ZACHARIAS, *Bodo compressus* LEMMERMANN. Alpha-mesosaprobic. Its name refers to its thin shape.

It is similar to *Hexamita angusta* (KLEBS) LEMMERMANN, but its shape is elongated, thin and striae and rostrum are missing (LEMMERMANN 1914, STARMACH 1968). Its typical form is shown in Fig. 44.

Hexamita insana spec. nov. (Fig. 46–47)

The cell is heart-shaped, with a depression anteriorly, broadly rounded posteriorly. Its size is 15–18×11–13 μ. Swimming-flagella, somewhat longer than the body,

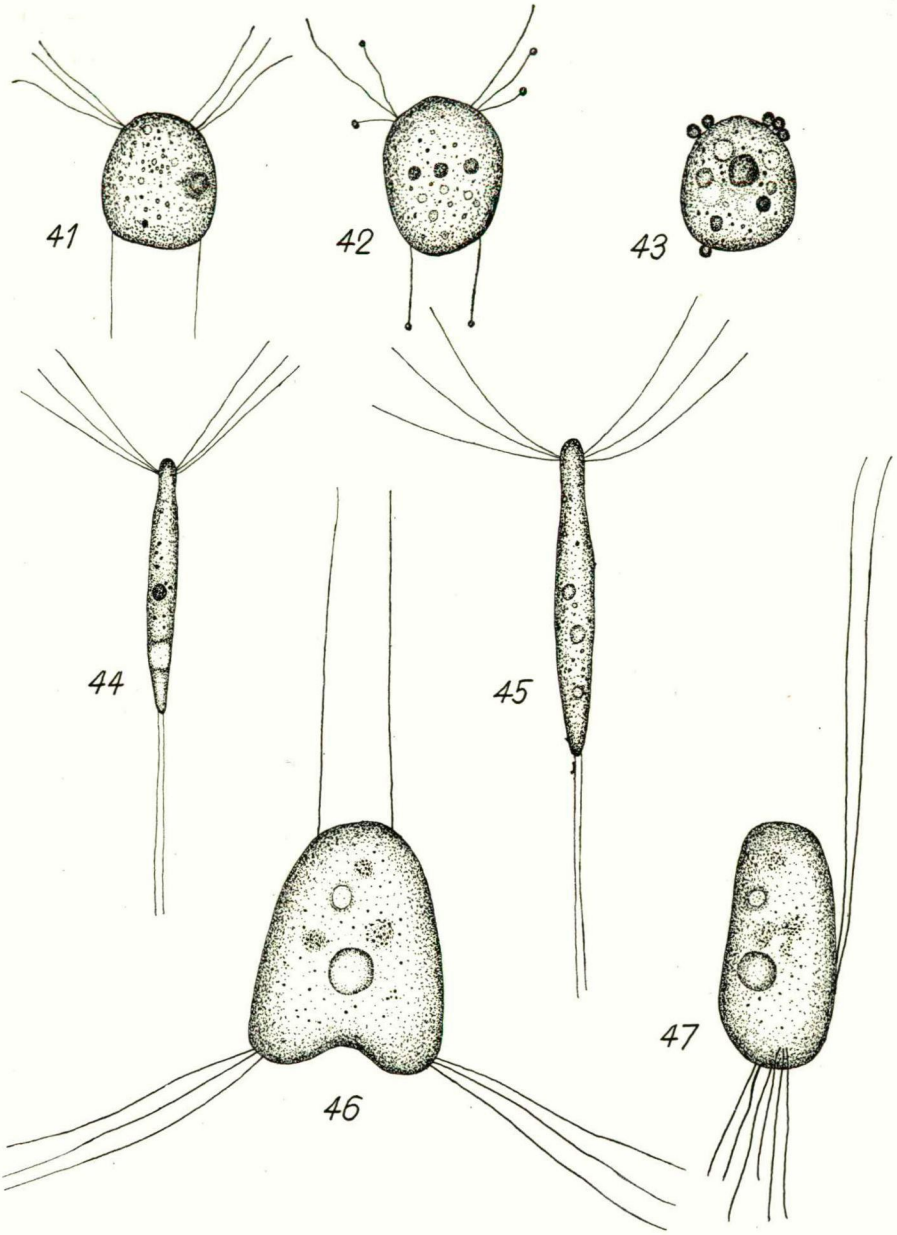

Fig. 41—43. *Hexamita hollandei*, 44—45. *Hexamita gracilima*, 46—47. *Hexamita insana*.

project from the anterior elevations. The trailing flagella project from the upper third of the dorsal side of the body, to a length of 25–32 μ. Periplast thin, smooth and hyalin, but the cell is not metabolic. The protoplasm is spotted by granules. There is a contractile vacuole in the posterior part of the body. Scattered in the plasm, there are several glycogen granules and food vacuoles. The body is splitless. Motion rotating and extremely fast, immoderate, hence its name.

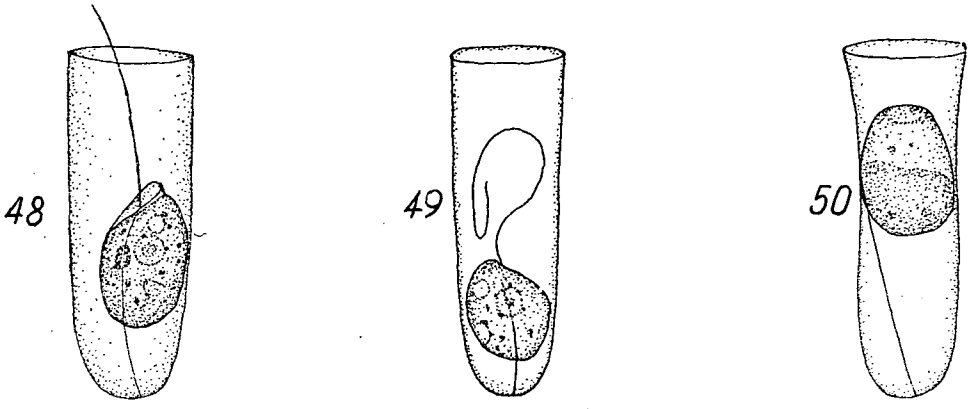

Fig. 48—50. *Bicoeca szabadosi.*

Table VIII — *Some hydrochemical properties in the environment of the new species*

Organisms	Saprobity	Dissolved O_2 mg/l	Consumed O_2 mg/l	BOD_5 mg/l	pH	NH_4+ mg/l	H_2S mg/l
Mastigamoeba polysaprobica	p	0.0	67.0	11.5	7.5	32.0	3.7
Mastigella parva	p	0.0	114.2	153.4	7.0	13.6	2.8
Mastigella maculosa	p	0.0	936.0	434.0	6.7	38.7	–
Mastigella ovata	p	0.0	274.0	128.0	7.0	31.0	9.0
Mastigella compacta	p	9.9	2.9	4.0	7.0	0.2	0.0
Cercobodo lagoenaris	p	0.0	192.0	276.0	7.0	40.0	0.0
Cercobodo robustus	p	0.0	4729.0	706.0	6.0	35.5	0.0
Cercobodo ventricosus	p	0.2	41.6	23.4	7.2	0.9	0.0
Bicoeca starmachi	b	9.4	3.6	4.4	7.2	0.04	–
Bicoeca szabadosi	b—a	11.4	5.2	–	7.7	0.71	–
Hexamita longifila	p	0.0	210.0	345.0	7.5	39.0	1.5
Hexamita skujai	p	0.0	47.0	29.0	7.5	30.0	3.8
Hexamita hollandei	p—a	10.9	16.0	9.6	7.3	25.0	0.0
Hexamita gracilima	a	14.1	17.1	13.8	7.5	1.0	0.0
Hexamita insana	b	13.8	4.5	5.6	7.2	0.2	0.0

It was found in the pure water of the Tápió brook on February 27, 1970, together with diatoms and *Monosiga fusiformis* KENT, *Desmarella irregularis* STOKES, *Bodo globosus* STEIN, *Bodo proximus* SKUJA, *Bodo designis* SKUJA, *Mastigella penardi* LEMMERMANN. Beta-mesosaprobic.

The shape of the new species is very characteristic and can be easily separated from other species (LEMMERMANN 1914, STARMACH 1968).

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Néhány új Zooflagellata faj Magyarországról

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Kivonat

Jelen dolgozat a több éves rendszeres mikroszkópi vizsgálatok során újnak bizonyult Zooflagellata fajokat ismerteti és szemlélteti, megadja környezetük legfontosabb kémiai paramétereit. Az új *Mastigamoeba, Mastigella, Bicoeca, Amastigomonas* és *Hexamita* fajok a legkülönbözőbb vízi biotópokból kerültek elő, folyóktól a szennyvíztisztító berendezésekig.

Nekoliko novih vrsta Zooflagellata iz Madjarske

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Abstract

U radu su na osnovu višegodišnjih sistematskih mikroskopskih ispitivanja prikazane nove vrste Zooflagellata, kao i najvažniji hemijski parametri njihove sredine. *Mastigamoeba, Mastigella, Bicoeca, Amastigomonas* i *Hexamita* kao nove vrste konstatovane su u najrazličitijim vodenim biotopima (reke i baseni sa uredjajima za prečišćavanje otpadnih voda).

Несколько новых разновидностей Zooflagellata из Венгрии

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Резюме

Данная работа сообщает о разновидностях Zooflagellata которые на основании систематических многолетних микроскопических исследований признаны новыми, даётся их описание, приводятся наиболее важные химические параметры их среды. Новые разновидности *Mastigamoeba*, *Mastigella*, *Bicoeca Amastigomonas*, *Hexamita* обнаружены в различных водных биотопах, начиная от рек и до устройств по очищению загрязнённых вод.